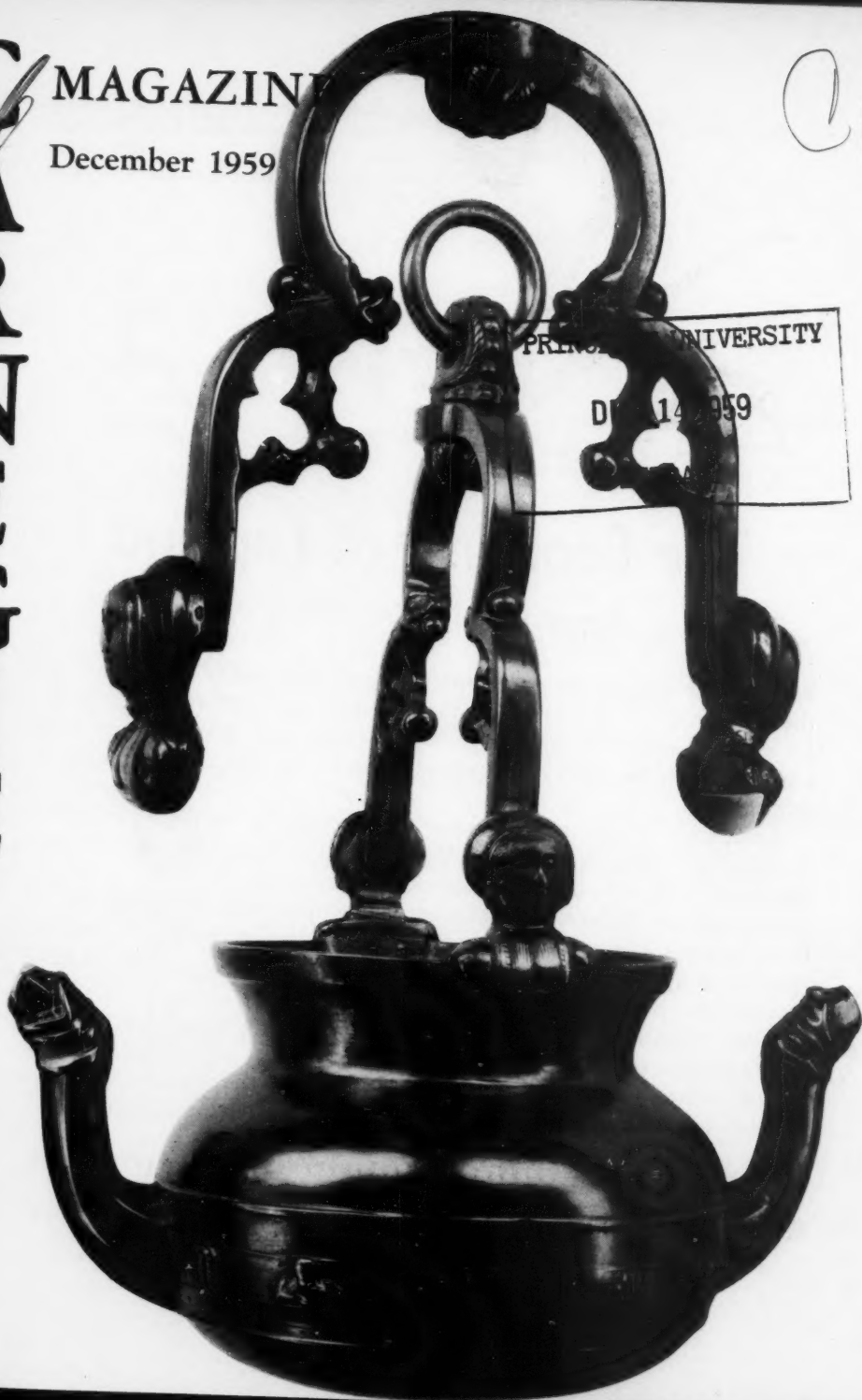


CARNegie

MAGAZINE

December 1959

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CARNEGIE INSTITUTE 4400 Forbes Avenue, Pittsburgh 13, Pennsylvania

Weekdays 10:00 A.M. to 5:00 P.M.

Open to 10:00 P.M., December 1, 3, 8, 10, 17

Exotic Art exhibition weekdays 11:00 A.M. to 5:00 P.M.

Open to 10:00 P.M., December 1, 3, 8, 10, 17

Sundays 2:00 to 5:00 P.M.

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Luncheon 11:00 A.M. to 2:00 P.M., weekdays

Snacks 2:00 to 4:00 P.M., weekdays

Dinner 4:30 to 7:00 P.M., December 1, 3, 8, 10, 17

Closes 1:00 P.M., Christmas Eve

Entire building closes Christmas Day and New Year's Day

COVER

Bronze vessel that could have hung by a great, hooded fireplace in some baronial castle of northern Europe during the Renaissance. It is mid-sixteenth century and probably German. Recently acquired for the section of decorative arts through the Sarah Mellon Scaife Fund.

CARNEGIE MAGAZINE dedicated to literature, science, art, and music, is published monthly (except July and August) at 4400 Forbes Avenue, Pittsburgh 13, Pennsylvania, in behalf of Carnegie Institute and Carnegie Library of Pittsburgh. James M. Bovard, editor; Jeanette F. Seneff, associate editor; Dorothy E. Teckmeyer, assistant editor; Melva Z. Bodel, advertising manager. Telephone MAYflower 1-7300. Volume XXXIII Number 10, December 1959. Permission to reprint articles will be granted on request. Copies regularly sent to members of Carnegie Institute Society. Subscriptions outside Allegheny County \$2.00 a year.

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DECEMBER CALENDAR

NEAPOLITAN PRESEPE

Again this Christmas the Neapolitan *presepe* will stand before the reconstructed façade of St. Gilles. The gift of Mr. and Mrs. George Magee Wyckoff two years ago, this teeming, miniature street scene includes some 65 human and 30 animal figures, nearly 100 accessories, and numerous architectural elements. The *presepe* was the work of many artists in Naples c. 1720 to 1825. It may be seen from December 12 to January 10.

EXOTIC ART FROM ANCIENT AND PRIMITIVE CIVILIZATIONS

Eleven hundred pieces from the collection of Jay C. Leff continuing in the third-floor galleries through January 3 include African, Babylonian, Cycladic, Egyptian, Etruscan, Oceanic, and Pre-Columbian art. The oldest is a Paleolithic drawing incised on bone, believed one of two such in this country.

Visiting hours: weekdays 11:00 A.M. to 5:00 P.M.; to 10:00 P.M., on December 1, 3, 8, 10, and 17. Sundays 2:00 to 5:00 P.M. Admission fee, 25¢.

Salon of Photographic Art

The 47th annual Pittsburgh International Salon of Photographic Art will be hung on the second floor December 19 through January 17.

Color slides from the Salon will be shown in Lecture Hall January 3, 10, and 17, at 2:30 P.M.

The Salon is presented by the Photographic Section of The Academy of Science and Art of Pittsburgh.

LOCAL ARTIST SERIES

Fifteen sculptured pieces by Eliza Miller remain on the third floor, gallery K, through January 3.

CONTEMPORARY ARCHITECTURE

Photographs, panels, models, and materials showing new building in Caracas, through December 13.

Recent work of thirteen contemporary American architects similarly displayed through December 8.

FROM THE PRINT COLLECTION

Twentieth-century drawings from the Institute collection—such artists as Modigliani, Pascin, Klee, Kuniyoshi, Dubuffet, Reg Butler, Burri, and Ellsworth Kelly—in gallery J until January 10.

TREASURE ROOM

Recent decorative arts accessions will follow the textiles and other arts of the Copts this month.

CARNEGIE INSTITUTE SOCIETY LECTURES

Monday evenings in Mt. Lebanon Auditorium

Tuesday evenings in Carnegie Music Hall

Two performances each, 6:30 and 8:30 P.M.

Admission by membership card

December 7, 8—RURAL ENGLAND

Alfred Wolff has changed his program to feature historic and contemporary scenes of lovely England.

January 4, 5—ISRAEL

The Society series resumes after the holidays with Russell Wright's film on this new nation, its shrines, its people and their achievement.

ARCHEOLOGY AND THE BIBLE

Dr. William Foxwell Albright concludes his series of illustrated talks with "The Dead Sea Scrolls and the New Testament" on Wednesday, December 16, 8:15 P.M., in Carnegie Lecture Hall. Free.

COLLEGE STUDENTS ON VACATION

Exotic Art from the Leff collection, as well as newly arranged Museum exhibits, will very likely attract many college students home for the holidays. Reference and Technology departments of the Library, also, anticipate a busy Christmastime with term papers.

TABLE SETTINGS FROM FAR AND NEAR

Mrs. Benjamin Lencher's newest exhibit of miniature table settings represents twelve different countries. Library corridor, through February.

PENNSYLVANIA ICE-AGE ANIMALS

Skulls from some of the 500 ice-age animals of 52 different kinds, assembled from the 15,000 bones found so far at Lloyd's Rock Hole, Bedford County.

DISNEY NATURE FILMS

Adeli's Penguins is scheduled for December 6 and *Beaver Valley*, 13th. Lecture Hall, 2:15 P.M.

CHILDREN'S SATURDAY GROUPS

Vacation for Tam O'Shanter's and Palettes December 19, 26, and January 2; Junior Naturalists and Nature Club, the 26th and 2d. No movies the 26th and 2d. Story Hour regularly every Saturday.

SUNDAY ORGAN RECITALS

Christmas Carol Festival in place of the recital December 6 and 13 (page 341). Marshall Bidwell will feature Christmas music the 20th and 27th, sponsored by the Arbuckle-Jamison Foundation. Dr. Bidwell's recitals are broadcast by WLOA.

A WALK THROUGH THE LEFF COLLECTION

GORDON BAILEY WASHBURN

MANY visits are required to become acquainted with the eleven hundred objects in the Jay C. Leff collection now on view in the Department of Fine Arts at Carnegie Institute. The time that remains until January 3, when this remarkable exhibition closes, is scarcely enough to do it justice. It is a museum in itself, inviting repeated strolls through its many marvels. Curious details in both form and decoration provide inexhaustible sources of interest, at the same time challenging our paucity of knowledge and the rigidity of any conventional approach to them.

As we adventure in these little-known cultures, seeking to navigate uncharted seas of art, we come to cherish certain artifacts beyond others. My own admirations are now becoming too numerous to note, but it may be possible to mention a few of them that are worth every visitor's attention. As he enters the exhibition, for instance, every visitor will wish to turn to the right-hand corner to look at the Magdalenian bone (catalogue no. 1) from a cave-man site that may be dated no later than 20,000 B.C. Its delicate and naturalistic drawing of an antlered elk reminds one of Coomeraswamy's acid comment on all civilizations: "Since the cave man, what a decline!"

To move to the five Cycladic stone objects (40-44) in the center of the next case produces, however, no decline in our delight. Dating from the second millenium B.C., they precede classical Greek material by more than a thousand years, being the work, savants believe, of immigrants from the city of Troy II who moved into the Aegean islands from Asia. The remarkable little shivering Venus strikes one (in spite of her



(144) BARK PAINTING
Australian, Aborigine. Before A.D. 1900
Wood, 48" x 10 3/4" wide

youthfulness) as being the great-grand-mother of all the famous Venus figurines from the Greeks themselves to French neoclassicists like Houdon and Ingres. The beautiful "frying pan" vessel, a ceremonial type found in the Cycladic tombs, is decorated on its sides with a wave motif reminiscent of a Cretan one.

There is no purity in all man's art more nearly absolute than that expressed by these ancient Cycladic islanders, a purity, moreover, that is not one of life-denial but rather of warm acceptance, of perfect unity. Looking at these subtle things we cannot resist the comparison that comes to mind between them and certain modern sculptures. In this instance, it is Brancusi's art that occurs to us because it also is severely simple in style. But this likeness cannot be carried very far without falsification. It is true that moderns have turned to primitive and ancient arts to find release from Renaissance traditions and conventions. Sometimes, too, as with a Picasso or a Modigliani, there have been stylistic borrowings, in the same way that Degas formerly borrowed artistic devices from Japanese prints. But most modern artists have not been anxious to paraphrase old forms, because they take no interest in the sacramental reasons for these tribal images nor in their emotional functions for the societies in which they were made. Resemblances are therefore but skin deep. The moderns are expressing their own individual and social feelings in their art, and these, naturally enough, are of a different sort than those of other peoples, other times, and other places.

Although our initial gallery offers many other beautiful objects, I would like to mention only one: the low-relief figure of Queen Nefertiti (18) on the center wall. The plaque is but a small fragment and badly weathered, yet the delicate cutting is still

clear and moving. The Egyptian queen holds out her arms toward a larger figure, a goddess, and bears in her hands long stalks of lotus as an offering. The remains of faience inlays are still visible.

As we pass into Oceania in the next gallery, we move through eons of time and halfway circumnavigate the globe as well. We are in the nineteenth century in New Guinea, whose native Melanesian art fills the room with its mysterious figures and faces. As in most parts of the world, things in wood have not easily survived because of climatic conditions. Yet most that we here see reflects an ancient tradition of New Guinea iconography even if the exhibited examples are relatively recent. One of the most effective sculptures is the male figure from Lake Sentani (131), whose concentrated malevolence seems as if it were



(42) FEMALE TORSO
Cycladic. 3d millennium B.C.
Marble, 6"



(482) SEATED PRIESTESS FIGURINE
Mexico, Maya from Jaina, Campeche. c. A.D. 500
Terra cotta, 9"

about to burst the log-bound image.

Whereas Sir George Sansom sums up the religion of Japan as "a nature worship of which the mainspring is appreciation rather than fear," the Melanesians apparently have lived in a desperate awe and even terror of the powers behind nature. Such a figure—or others like the initiation headdress (96) with attached masks from the Sepik River region—indicate a native craftsman's power to dramatize this fearfulness and to imbue his figures with its terrible intensity. His social consciousness of a dangerous, supernatural world can color a native's entire relation to life, giving his art that peculiar tribal unity of form that distinguishes it from the indi-

vidualistic products from our modern civilizations. This characteristic of a primitive art to reflect a spiritual agreement cannot be imitated, being no more nor less than a visible expression of a tribal belief and faith.

When we pass into the right wing at the center of Gallery F, we discover the beautiful wooden bowls from Huon Gulf in New Guinea (120-121). These may also remind us that, unlike the Melanesians, we Westerners live in a largely secular world. Religious considerations are not our daily bread, whatever our ideals may be, nor is our daily bread served us in a sacramental container except at the altar of a church. The sacramental is reserved for Sundays

only. Gone is our primal world when daily life was a continuously spiritual activity — clothes, food, utensils, and all the paraphernalia of living being shaped in accordance with religious conceptions. We who may buy a silver breadbasket because it is a pretty piece of Sheffield plate feel that we are enlightened. Science, we say, has rescued us from superstitious practices. We have, rightly or wrongly, “advanced” beyond a primitive concern with magic, propitiation, and a sacramental conception of life.

Opposite these deep-breasted bowls are shown several superb Maori *tiki*, grotesque human figures in both bone and stone (154-155), as well as two handsome New Zealand war clubs (157) in bone and jade respectively. The protective charms known as *hei-tiki* were highly prized possessions of the warlike Maori. “In some cases they were worn only in alternate generations,” says the catalogue of the *Arts of the South Seas* (Museum of Modern Art, 1946), “being buried with the owner, then dug up and worn again by a grandchild. There was also the regulation that the wife of a captured chief had to send her *hei-tiki* to the wife of his captor.”

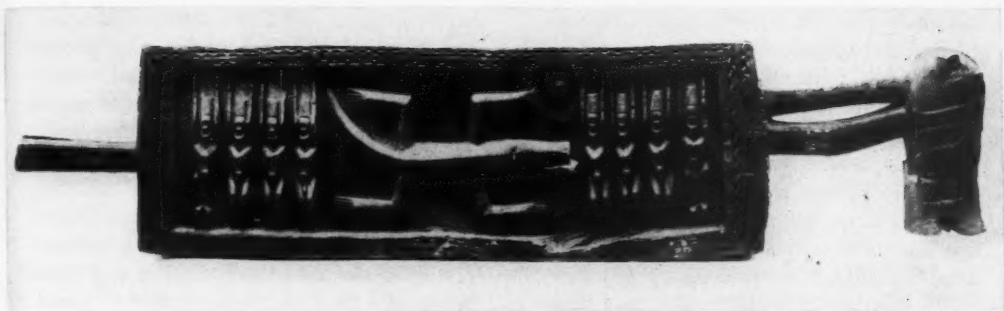
Entering at this point the galleries of African Negro art, we first come upon the wonderful wooden figures of the Dogon tribe of the Niger River valley. A glance at the map in the catalogue shows that their country is in the French Sudan far inland behind the Guinea coast. Because sheltered in caves, Dogon carvings have been better preserved than other wooden material, though none of them have any great age. The noble, ceremonial grainery in the form of a horse (184) is a remarkably handsome vessel. Like other ritual objects made by the Dogon, it has an elegance of style that rises above tribal distinctions, reminding us that Africa once supported civilizations of a very superior kind. The fine beak of the

bird mask on the wall beyond (187) moves us to the thought that man extends the creative function of Nature herself through such an art. So, too, in the small Dogon animals that graze upon our platforms, each as single and unitary as an egg. Herein Mother Nature and man's nature seem to collaborate without conflict or opposition.

Perhaps the best single Dogon work in the excellent Leff group is that of the harp



(397) "PRETTY LADY" FIGURINE
Tlatilco, Valley of Mexico. c. 1500 B.C.
Terra cotta, 2½"



(184) CEREMONIAL GRAINERY CONTAINER IN THE FORM OF A HORSE

Ceremonial figures including high priests carved on sides
Sudan, Dogon. 19th century (or earlier)
Wood, 84" long

(Balofon) player (196) which Mr. Leff believes may be somewhat earlier, perhaps even of the eighteenth century. Looking at it and meditating on its delicate refinements and stylizations, one realizes with what gratitude the artists of France and Germany early in this century came upon exotic Negro carvings in the curiosity shops and ethnographical museums of Europe. Here was an art, they realized, that was free of imitational tendencies, though it read with figurative clarity. Here, they saw, artists had developed their own constructions, transfiguring nature in terms of their human understanding, their central attitude towards life. Their works of art, it was clear, were never intended to be admired for their clever mimicry of appearances, but, on the contrary, were conceived of as being for sacramental purposes — for intercession with the spirits and for prayer. They had a life and death importance for maker and user, as we, too, must feel as we absorb the force of their lines and the power of their forms. Modern artists, protesting against an inconsequential Salon art that was designed only to dazzle triflers, saw their way back to an art of meaning in following their lead. It led into a mode of conceptual rather

than mimetic forms; it led toward a subjective imagery.

The African Negro material might well hold us for hours on end, imagining, for instance, the ritual dances where men wore masks as huge and heavy as the great Baga "Nimba" (235) with its two eyeholes between her massive breasts; or raised entire statues on their heads as do the Yoruba tribesmen (327); or even, like the Dogon, supported thirty feet of wooden filigree work largely by the strength of their teeth clasped about the transverse stick running through a mask (192). While the Bambara dancers danced, insuring the fertility of their crops by wearing the delicate antelope headdresses (206), we may think we hear the beat itself through observing the curvilinear rhythms and staccato repetitions of these stylized animals. So, too, with the Senufo "rhythm markers" (224), those tall, long-limbed figures that are used to thump out the measures of the ceremonial music.

We may even see some of this African music being played in the figures of musicians surrounding the king on the bronze cover of an Ashanti box (271). The retinue includes two warriors with shields, one offering his chief a human head, as well as

a female (the chief's wife?) who crouches behind the corpulent royal figure with devoted arms outstretched. For us, it is a native drama without resolution. Lovers of genre, the Ashanti evidently amused themselves by transferring every sort of daily sight into bronze for use as gold weights. Here are a running man, a prisoner, a mud-fish and many other miniature images of local Gold Coast life (260-265).

The destruction of the great city of Benin by the British in 1899 marks the end of one of the great African kingdoms that had flourished since before the fifteenth century. From the fragments of the royal metropolis comes the seventeenth-century bronze plaque depicting a warrior (299). It now seems probable that the Benin people knew bronze-casting before the advent of the trading Portuguese, perhaps inheriting it through Egyptian traditions that had survived. Here it is interesting to note that the caster has left a whole row of vent sticks behind the warrior's spear, almost as though he had forgotten to remove these evidences of his painstaking lost-wax process.

Even at an early date, the Benin were making images on order for Portuguese merchants, curious European-style fantasies such as the covered ivory beaker in the glass case (288), fussy though delicate nonsense when compared to such a noble wooden head as stands alone on a pedestal beyond (313). Even the magnificent covered gaming board of the Yoruba people on the farther platform (322) for players of *Mankala* (Deadpan) is conceived of as a religious utensil, not a profane object. Any game, at its heart, perhaps must call for blood, and this baroque board with its magical flying birds and covered containers has a mysterious flesh as well.

We have already glimpsed the Pre-Columbian galleries beyond, and now, walk-

ing into them, we find ourselves in a different world. The likenesses that people sometimes claim between these various cultures seem more often due to their common human base than to any true stylistic relationship of forms. Egyptians and Mayans are not to be connected merely because both used pyramids any more than because both carved human images or used earrings. The images of the arts do not simply follow one another Indian-file around the world. So, though we may exclaim "Oriental!" when we first see a freely brushed figure on a Mayan plate (471), we need not set out to prove a derivation. As soon connect the air-brush work of the Lascaux cave men of paleolithic times to modern advertising art.

Is it because of a less fear-ridden society that the art of the Mayans is more relaxed, more untroubled, and more elegant than others of Middle America? We know so little of them that the answer is not within our reach. This is no mere regional or tribal art, we feel certain, but rather an art of a high culture. It is an expression of a people who are considerably detached from immediate concerns for physical survival and a constant propitiation of irascible spirits. Examine, for instance, the marvelous little clay figures (476-482) from the island of Jaina just off the Mexican coast of Campeche. Large in spirit, full-bodied, and entirely open of mien, they stand or kneel quite at ease before us, their noble heads supported with unconscious pride and assurance, as natural in every gesture as if they were the aristocrats in an undisturbed paradise. Today their descendants, resembling them in feature but not in spirit, are once again merely a tribal group, their fan-

Mr. Washburn's article provides a handy guide-book for the visitor to the exhibition of Exotic Art from Ancient and Primitive Civilizations. He is, of course, director of the Department of Fine Arts.

tastic civilization—at one time more advanced in astronomy than any in the world—only an archeological reconstruction based upon abandoned ruins.

Perhaps his Pre-Columbian treasure, a treasure of baked mud and carved stone, is the richest section of the Jay C. Leff collection. Few people, one guesses, stop to consider that great works of art are seldom made of precious materials. The documentary history of the world, in fact, is written in sherds and pigments, which is to say, pots and paintings—a history almost wholly composed in the most available substance of creation, the common earth itself. Here, from the little Tlatilco females of 1,500 B.C. (397), twenty-two "Lolitas" excavated in the clay pits of a brickyard near Mexico City, all the way to the spectacular terra cottas of Las Remojadas in Veracruz—such a figure, for instance, as the seated female (533) with high armlets of bells and apertures for feathers above her lovely forehead—we see that for centuries the earth of Mexico has been increasingly molded into the imagery of her dreams. Even her obsessive nightmares are not lacking, from the terrible Mixtec "Xantile" figures (570), from Camino del Valle, to the Colima funerary vessel in the form of a dead human head (641).

The art of the Mexican modeler, particularly as practiced by the ancient people of Colima, will eventually take its place among the artistic achievements of man. Colima things must be regarded as remarkable in quality, even in a land of clay-handlers and clay artifacts. The barking coyote (645) is a masterpiece of observation and of the reconstitution of nature into art. So, too, is the serpent urn (638), its coils in some mysterious fashion succeeding in being human as well as serpentine. Here, in Gallery Q, we discover no end to our admiration as we look again and again at these pottery fur-

nishings from the tombs. Nor is it the least rewarding of experiences to turn from such naturalistic marvels to the stone images of Mezcala (608) in the same room. These figures are of such abstract severity that it staggers thought to realize they come from a nearby state and are believed to date from the same time.

With greater acquaintance, such exotic material as we find in the Leff collection will begin to find its way into the histories of art—has already, indeed, been included in several. Art history is not an old field of human inquiry, nor is it, as yet, one whose last page has been written. For a long time to come each generation will add to it with both new materials and new interpretations. Through any exhibition such as this we ourselves can see it being revised as though the process were taking place before our eyes. To most of us who visit the display, nine-tenths of the material is new and puzzling. We have not had to deal with it before, and it powerfully challenges our adaptability and our sympathies. Though its contents have been found on the same old planet that we humans have explored for so many centuries, it might almost have come from another world entirely. It is as new as the most modern art, although some of it is hundreds and even thousands of years old.

We can rejoice, therefore, that we have lived to see such fascinating human documents brought to light. Perhaps they are not destined to have the effect on our stylistic designing that Pompeii exerted after it began to be unearthed in the eighteenth century. But we may note with interest that it has already had an excellent effect upon the work of our contemporary artists, releasing their imaginations to discover forms that might easily have been repressed had the invitation that these artifacts offer to conceptual imagery not been accepted.

CHRISTMAS IN VENEZUELA

TRADITIONS old and new are part of Christmas in Venezuela. Probably more than any of her sister South American republics, Venezuela has felt the tremendous impact of the twentieth century. The result has brought many changes to Venezuelan customs, including those of Christmas.

The holiday season in Venezuela begins December 16 at four o'clock in the morning with Christmas masses. These masses last for nine days—symbolizing the Holy Virgin's months of expectation—and end on the 25th. They are named the *aguinaldo* masses, after the religious songs that are the feature of each service. Rhythmic and colloquial, the *aguinaldos* are accompanied by rattling maracas.

Clanging bells and popping rockets summon the people to worship at the *aguinaldo* masses. After the services the people flock through the streets and return to their homes, perhaps to drink a cup of black, sweetened coffee as the sun rises.

During the nights of the *aguinaldo* masses, by custom, the children roller skate in plazas that the police have obligingly roped off from traffic. The skating usually begins at midnight, or before, and continues until late in the morning, with a break at mass time. At the fringe of the skating area, vendors sell hot coffee and fried cakes.

The old tradition of constructing manger scenes in Venezuelan homes remains a strong one. Called *nacimientos*, these scenes usually include the Christ Child, Mary and Joseph, the Shepherds and the Three Kings—all set against a Venezuelan backdrop of palm leaves and tropical flowers. Traditionally, the Infant Jesus is not placed in His manger until after midnight on Christmas Eve. To parallel the story of the Nativity, the

Three Kings are first placed some distance from the manger. As the days pass, they are moved in closer and closer to the manger until on January 6, the Day of Kings, they reach the Christ Child to present their gifts. Venezuelan families are exceptionally proud of these carefully constructed *nacimientos*. They are often placed so as to be visible from the sidewalk for the pleasure of passers-by.

Another traditional feature of Christmas in Venezuela is *hallacas*, the national Christmas treat. Just as it would not be Thanksgiving in the United States without a turkey, in this tropical land it would not be Christmas without *hallacas*. The ingredients include chicken, pork, shortening, almonds, olives, raisins, hard-boiled eggs, and seasoning. This intricate concoction is surrounded by a corn paste, wrapped in a banana leaf and boiled in water. Needless to say, there is a great art in making *hallacas*, and great gusto in eating them.

Singing groups often move from house to house in Venezuela during the Christmas season, in the manner of carol-singers in the United States. Often these songs are accompanied by maracas, small guitars called *cuatros*, and various indigenous percussion instruments. In their repertoire the singers include *aguinaldos*, similar to those sung at the Christmas masses, and jocular Venezuelan folk songs called *villancicos*. Venezuelan songs at Christmas are usually composed of rhyming couplets. Original verses are frequently introduced by the singers.

An *aguinaldo* is not only a type of song, but also a seasonal gift to those who have been of service throughout the year. *Aguinaldo* gifts are sometimes solicited by a tactful card asking that the sender be remembered. Although at other times, there is no



Courtesy Creole Oil Corporation

CHRISTMAS GREETINGS ARE EXTENDED VIA
A LIGHTED OIL DERRICK IN VENEZUELA

reminder, it is still very much expected.

On Christmas Eve, or *Noche Buena* as it is called, the holiday season reaches its climax. At the churches the people celebrate the midnight Mass of the Cock, and the choir sings special songs devoted to the final night of the *aguinaldo* masses. After mass, Venezuelans partake of the feast of the year—the Christmas supper.

In days gone by Venezuelans invariably returned to their homes for the Christmas supper. Today in Caracas it is not uncom-

mon for them to go out to a night club for the big event, which, in its celebrative aspects, compares with New Year's Eve in this country. But whether at home or in a club, everything is done to make the Christmas supper just as festive as possible. There are plenty of *hallacas* for all, and tables are filled with sugar-crusted ham, turkey, sweets, and choice wines.

The many citizens of the United States who live in Venezuela have come to enjoy the nation's Christmas traditions. In Caracas alone there are an estimated twenty-five thousand North Americans, and many more live near the oil fields on Lake Maracaibo and in eastern Venezuela.

Although Venezuelans adopted the Christmas-tree custom from Europe, the North Americans have introduced some new Christmas customs in Venezuela. In recent years, for instance, they have imported Christmas lights from the United States, which they string on some of the tropical vegetation in their yards. Now more and more Venezuelans are doing the same thing, and many suburbs in Caracas are filled with lights. A novel twist to this Yankee import is the stringing of lights on some of the derricks in Venezuela's many oil fields.

The holiday season draws to a close in Venezuela on January 6, the Day of Kings. A few years ago deserving youngsters believed it was the Three Kings who brought them presents. At bedtime on the Eve of Epiphany, according to the custom, the children put their shoes up on the window sill and placed wisps of straw inside them "to feed the camels of the Magi." When the children awoke the next morning, they discovered gifts in place of the straw.

Now this charming custom has faded, although it is still observed in parts of the interior, and presents for the children are

[Turn to page 340]

VICTOR HERBERT AND PITTSBURGH

EDWARD N. WATERS

WHEN Victor Herbert, Irish-born and German-trained, arrived in the United States (1886) at the age of twenty-seven, a connection with Pittsburgh was probably farthest from his mind. If any possibility was more remote, it must have been a career as a composer of operettas. But destiny plays strange tricks on a man, and it brought Herbert fame in a two-fold capacity, as the greatest operetta composer of his day and as conductor of the Pittsburgh Symphony Orchestra. Unfortunately (or fortunately—who can say?) his association with the Art Society of Pittsburgh, which sponsored the Orchestra, was far shorter lived than his writing of musical shows.

Herbert was one of those admirable figures who could do expertly anything he attempted professionally, be it composing, conducting, or playing the cello. He was also ambitious and impatient, emotional and sometimes fiery tempered. He was not one to be long satisfied in a mediocre position or with mediocre music-making. Yet he had to make music, and he ventured into many activities before following anything that could be called a consistent pattern. His cello playing was superb, his string quartet promotion was inspiring, his conducting (particularly as a protégé of Anton Seidl) was enthusiastic, his compositions were grati-



VICTOR HERBERT

fy. Within a few brief years he became one of the best known artists in New York.

But he wanted an ensemble of his own, and he found it first as leader of the famous Gilmore Band, which he took on long tours and raised to a pinnacle of excellence. He was at the head of this enormously popular group when the call came to take over the Pittsburgh Symphony. Naturally he responded with alacrity, and both Pittsburgh and Herbert were immensely benefitted.

The Orchestra, formed in 1895, came into existence twenty-two years after its parent, the Art Society, was founded. Its first conductor was the English organist, Frederick Archer, who officiated for three seasons and then had to make way for a better man. The committee to find a new conductor con-

Mr. Waters is assistant chief of the Music Division of the Library of Congress. Born in Kansas, he is a graduate of the Eastman School of Music and is author of *Victor Herbert: A Life in Music* (Macmillan, 1955), a definitive biography that may be borrowed from the Carnegie Library of Pittsburgh. His article is presented to mark the centenary of the birth of Victor Herbert (1859-1924). Mr. Waters is now doing research on Franz Liszt.

sisted of W. N. Frew (the first president of Carnegie Institute), H. C. Frick, William McConway, Reuben Miller, and Jacob Slagle, all leading citizens and all proud of the orchestra they were nurturing. It was no easy task to find a conductor who, as the years passed by, would place the group on a par with the famous ensembles of Boston and New York. There were numerous applicants for the post, but Herbert was not among them. He was busy with his own affairs, and the committee was not apt to think of a band leader and an already successful operetta composer as suitable for such a serious and idealistic job.

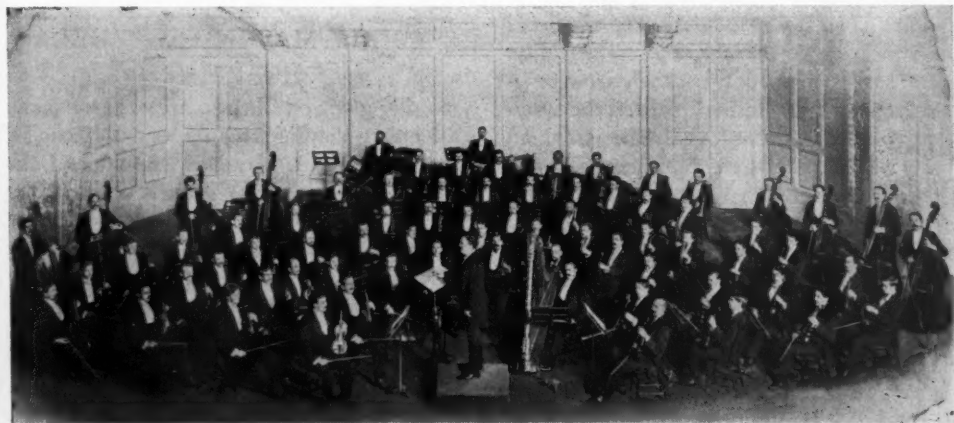
It was here that destiny played its part. Mr. Frew approached the august Boston critic, Philip Hale, for assistance, and out of this sagacious negotiation came Herbert, who was engaged for one season only, 1898-99. Beginning with great enthusiasm, he prophesied a permanent future for himself in the development of Pittsburgh's musical life. Certain hostile spirits, viewing Herbert as essentially a purveyor of popular music, criticized the appointment, but they failed to shake the confidence of the committee.

Herbert's first program, presented on November 3, 1898, in Carnegie Music Hall, then the home of the Pittsburgh Symphony, was excellent:

<i>Leonore Overture No. 3</i>	Beethoven
Aria "Non più andrai" from <i>Le Nozze di Figaro</i>	Mozart
<i>Symphony No. 5</i>	Tchaikovsky
Symphonic Poem <i>Le Rouet d'Omphale</i>	Saint-Saëns
Aria "Dio possente" from <i>Faust</i>	Gounod
Prelude to <i>Die Meistersinger</i>	Wagner
(Soloist: Giuseppe Campanari)	

The concert was a huge success, and the audience was jubilant. If the local critics were overly laudatory, they should be pardoned; an experienced man was at the helm, and the path to artistic perfection seemed invitingly open.

At the end of a thoroughly satisfactory season Herbert was re-engaged, the orchestra was enlarged, and two New York concerts were arranged. The critics in the metropolis found the orchestra not entirely fault-free, but, as one of them pointed out, "there is little but praise for the conductor . . . Pittsburgh had better look out or New



PITTSBURGH SYMPHONY ORCHESTRA IN CARNEGIE MUSIC HALL WITH VICTOR HERBERT AT THE PODIUM

York will be trying to win back Victor Herbert. We need such a man badly." On returning to his home Herbert was an object of adulation and was immediately hired for a third season. The future looked bright.

The third year with the Pittsburgh Symphony may have been the happiest of Herbert's life. In an astonishingly short time he had firmly established himself as an outstanding conductor. He was giving Pittsburgh excellent programs and presenting the best of soloists. He had completely forsaken his band affiliations and abandoned—it was thought permanently—the field of operetta. When a suitable opportunity arose—not often, it must be admitted—he performed an American work, but he never became a promoter of nationalism for its own sake. He traveled extensively with the Orchestra, and offered fine music to the hinterland, which rarely had an occasion for such an experience.

A man of strong personality cannot help making enemies, and it was particularly unfortunate that Herbert's nemesis was the manager of the Orchestra, George H. Wilson. Mr. Wilson must have been a prim man with a false sense of dignity and a position to maintain. In any case he disliked Herbert's heartiness, open manner, and congeniality. After several years of necessarily close association with him, Herbert realized the situation could not be improved. The last three years of his conductorship, therefore, saw a gradual deterioration in office conditions and a growing misunderstanding, undoubtedly goaded by Wilson, on the part of the Orchestra Committee of the Art Society. It was charged that his programs were becoming too classical, and some of his touring demands were considered unreasonable. The end was in sight, although he remained as conductor through the season of 1903-04.

When the city learned that Herbert would

not be back for a seventh season, two factions immediately made themselves vocal—and unfortunately the weaker side won. Those who were sincerely concerned for the city's musical health allowed Mr. Wilson and the Orchestra Committee to have their way, and Herbert resumed his operetta career in New York. There, too, he formed the Victor Herbert Concert Orchestra, but it was symphonic only in size and competence, not in the content of its programs.

In Herbert's departure Pittsburgh lost a great artist and a great personality. The cultural appreciation of the town was not deep enough to demand his retention, and he was made the victim of the chicanery and superficiality of his enemies.

Yet it must be admitted that Pittsburgh's loss was the country's gain. Herbert again turned to the lighter forms of composition, spun out entrancing melodies and stirring choruses, affected national legislation and the welfare of composers, and became a national idol. He was, indeed, Pittsburgh's gift to the nation—but through shortsightedness, not through generosity. However, let us not be ungrateful today.

CHRISTMAS IN VENEZUELA

[Continued from page 337]

usually given on Christmas Eve in the name of either the Infant Jesus or St. Nicholas. Sometimes in a blend of the old and the new, the legend of the Three Kings provides Venezuelan children with a second chance to receive gifts—those whom Santa forgot.

Christmas in Venezuela, then, is a mixture of the joyful and the devout, the up-to-date and the traditional. Also ever present in Venezuela's celebration of the birth of Christ is a mystic and uniting spirit, which in the deepest sense expresses a nation's wonderment at the Christmas miracle.



KOBZAR CHOIR MEMBERS, RECENTLY FROM THE UKRAINE, IN RICHLY EMBROIDERED COSTUME

Many spent years in concentration camps, nearly all now have their prized United States citizenship papers. Their voices bring, in full diapason, the very ground swell of the great music of the Ukrainian steppes.

UNITED WE SING

NAMED for a great Ukrainian poet, Kobzar Choir is one of twenty-six heritage groups participating in the twenty-third Christmas Carol Festival in Carnegie Music Hall. Including the audience, which joins in five of the carols, there will be two thousand singers.

A notable feature among the closing events of Pittsburgh's Bicentennial celebration, United We Sing, interwoven with its Pageant of the Trees, will again be held on two Sunday afternoons: December 6 at 2:30 and 4:30 o'clock, and December 13 at 3:00. Doors open a half hour before each presentation. On December 13 the program is broadcast by WLOA. It is also recorded by WDUQ and may be heard on Christmas eve.

Mrs. Samuel Ely Eliot is co-ordinator of the program, Marshall Bidwell is director of the combined choirs and community singing, and Howard Ralston is accompanist. Members of the Junior League carry major roles in the pageantry with Mrs. Richard L. Thornburgh directing, assisted by Dr. and Mrs. Lawrence N. Canjar, Mrs. B. B. Corson, and Miss Anna K. Dice.

Soloists will be George Story, Robert Bodycombe, and James Lumberger.

Groups participating and the heritage in Pittsburgh that is represented by their carol are the following:

St. Mary of the Mount Polyphonic Singers	<i>Latin</i>
Special Group	<i>Welsh</i>
Carnegie Tech Bagpipers	<i>Scottish</i>



THE HOLY FAMILY IS PART OF THIS POPULOUS NEAPOLITAN PRESEPE, THE GIFT OF MR. AND MRS.

Kobzar Choir	<i>Ukrainian</i>	Shaler High School Chapel Choir	<i>English</i>
Concert Choir, Our Lady of Mercy Academy	<i>Italian</i>	Ellis School Glee Club	<i>French</i>
Junior Presern Singing and Cultural Society	<i>Slovenian</i>	St. George's High School Glee Club	<i>Norwegian</i>
St. Joseph's High School Glee Club	<i>Puerto Rican</i>	Cultural Group of Czecho-Slovak Society of America	<i>Czecho-Slovak</i>
St. Luke's Lutheran Church Choir of Monessen	<i>Finnish</i>	Falcon Choral Singers	<i>Polish</i>
St. Gabriel's Roman Catholic Church Choir	<i>Slovak</i>	St. John Damascene Choir	<i>Magyar</i>
Elizabeth Seton High School Glee Club	<i>Irish-Gaelic</i>	Philip Visnich Eastern Orthodox Church Choir of St. Sava	<i>Serbian</i>
Group from Japan	<i>Japanese</i>	St. Nicholas Eastern Orthodox Church Choir of Wilmerding	<i>Macedonian</i>
St. George's Syrian Orthodox Church Choir	<i>Syrian</i>	First Trinity Lutheran Church Choir	<i>German</i>
University Chinese Club	<i>Chinese</i>	St. Francis Academy Choir	<i>Lithuanian</i>
St. Mary's Russian Orthodox Church Choir of McKeesport	<i>Russian</i>	Bidwell Street Presbyterian Church Choir	<i>Negro</i>
		St. Nicholas Greek Orthodox Cathedral Choir	<i>Greek</i>



MR. AND MRS. GEORGE MAGEE WYCKOFF, AT THE INSTITUTE FOR THE THIRD CHRISTMAS SEASON

NEW COMMITTEE MEMBERS

WIDER community participation in the affairs of Carnegie Institute is now possible through enlarged membership in the Fine Arts and Museum Committees, according to an announcement by President James M. Bovard. A recent change in the by-laws of the Institute permits addition of six to each committee, each to serve for a two-year term. Under the trusts of Andrew Carnegie, Trustee members are elected for life; hence the revised by-law permits more flexibility on the committees. Five members have so far been added to each, all people who have already demonstrated their special interest in art or natural history.

The new Fine Arts Committee members

are: F. J. Close, vice president, Aluminum Company of America; Henry Oliver, Jr., art collector; C. McKenzie Lewis, Jr., attorney; the president of the Women's Committee, now Mrs. William C. Robinson, Jr.; president of the Junior Council, now Mrs. James H. Heroy, Jr.

The Museum Committee additions are: Theodore L. Hazlett, Jr., attorney; Bernard S. Horne, vice president, Joseph Horne Company; George R. McCullough, vice president, McCullough Electric Company; Robert S. Waters, Johnstown industrialist and banker; and Peter Burchfield, Joseph Horne Company.

Each of the new committee members may succeed himself for a second two-year term but not be re-elected until after one year.

a mark of quality



With the development of printing in the second half of the fifteenth century, a new art flourished — that of engraving on copper plates. Master of the medium was Albrecht Dürer of Nurnberg; and reproductions from his plates — marked with his familiar D within an A — have been coveted for centuries.

His scenes of the birth and passion of Christ are the heart of his work. Like all of his engravings, they are distinguished by fineness and full-purpose of line. In this, *The Nativity*, done in 1504 (the signpost above the inn carries this detail along with Dürer's monogram), every scratch, every stroke has its meaning.

Dürer, the master engraver, deserves praise; yet it is Dürer, the reverent interpreter of Christ, who speaks to many a heart this Christmas season.



always a mark of quality / H. J. Heinz Company

GRANDFATHER CLOCKS

WALTER J. MULVIN

ALMOST everyone is interested in grandfather clocks. When first introduced they were called long-swing, and some time later the term was long-case clocks. We now use the latter as correct terminology.

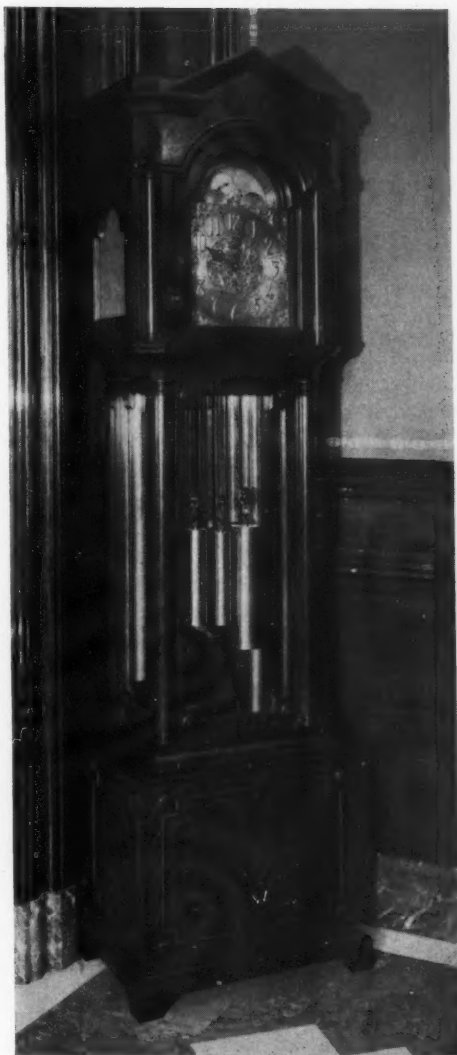
The term "grandfather clock" or "grandfather's clock" is believed to date back before the Civil War, although Webster's *New International Dictionary* suggests that the tall timepiece was probably so called by dealers with allusion to a once popular song that is still remembered, beginning:

My grandfather's clock was too large for the shelf,
So it stood ninety years on the floor;
It was taller by half than the old man himself,
Though it weighed not a pennyweight more.

Lovers of fine old clocks rather resent this idea, because in the song, the clock "stopp'd short, never to go again, when the old man died." And local collectors, for instance, own clocks that are known to have run well past ninety, or even a hundred, years. Incidentally, a "grandmother clock" is a miniature grandfather, standing less than five and a half feet high.

The enthusiastic study and collecting of old clocks and watches is well merited because of the time, effort, skill, and artistry of craftsmen for over five centuries in the horological field. Many great minds from many different fields of endeavor have contributed over the past centuries, until today the watches and clocks that tell us our time are precision-made to a degree closely approaching perfection. We discover this when we begin to delve into the interesting history of clocks.

Weight-driven gears were known for many centuries before they were incorporated into a mechanical clock, mainly be-



Hess Photographing Co.

GRANDFATHER'S CLOCK IN PRESIDENT'S OFFICE
RECENTLY PRESENTED TO CARNEGIE INSTITUTE

cause the ancients lacked a way to control this power. They needed some form of escapement to release this power slowly. If we take a child's toy auto and wind the spring, then let the wheels run free, the train of gears will run down very rapidly. A clock has a similar train and will run down in the same manner if there is not an escapement to stop the action. So the first clocks were made with what is known as the verge escapement. This escapement was used for many years on clocks, but could not be made to go accurately.

About 1360, Henry De Vick, of Wurtemberg, Germany, is said to have made a clock for Charles V of France. This clock was placed in the tower of the Royal Palace, now the Palais de Justice in Paris. After eight years in the making, it still did not keep time closer than two hours in a day. There was only one hand, the hour hand, but the dial was marked off with five spaces between the hours.

Between 1360 and 1500, more tower clocks were built, and possibly also a few domestic clocks. Examples of the latter, for the most part however, were repaired and rebuilt so often that, from the extant pieces, it is hard to prove their authenticity.

So we find that the first clocks were mostly large timepieces set into existing towers in churches and public buildings. Just as it is customary today to bequeath money for different kinds of institutions, so in olden times many bequests were to make and install a clock in some public tower.

Toward the end of the fifteenth century, the English had developed the skill and craft of clockmaking so that the smallest parish had a clock in its tower. These clocks were weight-driven and used with a folio balance and verge escapement. Peter Henlein, a locksmith in Nuremberg, Germany, had discovered how to make mainsprings of steel

and could use them as a source of power for portable clocks and watches. Thus no weights were needed, and it became possible to make smaller timepieces.

In 1583, Galileo, the great mathematician and scholar of Italy, saw an object swinging from the leaning tower of Pisa and arrived at the idea for a pendulum to be used in clockwork. This idea was conveyed to his son, and it is thought his son started to make such a clock but possibly never completed it.

However, in 1657, Christian Huygens of Holland did make a clock having a pendulum, and it was a great success.

At the same time there was in England, living in London, one Robert Hooke, who was at work with pendulums. He was inventor of the anchor escapement in very much the form we use today. Hooke was a famous architect, scientist, and mathematician, of whom it has been said that he was a universal genius in an age of intellectual giants. His thinking seems to have invaded every known field of science of his time, and, in whatever field he walked, that field improved. Perhaps his most important invention was the balance spring, or hair-spring, as applied to watches, which he caused to be made through the very capable

Mr. Mulvin is a watchmaker and watch repairman in Hubbard, Ohio, a graduate of Farrell School of Watchmaking. He is one of the very few American craft members of the British Horological Institute. Among his extensive collection of watch movements are some that are extremely rare, such as a Goddard and a Tompion watch.

Plans are being made for an exhibit of watches at the Museum next May, when the National Association of Watch and Clock Collectors will hold their annual meeting in Pittsburgh. D. H. Shaffer, president of the Ohio Valley Chapter, and Frederick Jauch, local watch and clock repairman and collector, co-operated in the description of the grandfather clock recently presented to the Institute.

hands of the great master, Thomas Tompion (c. 1639-1713). Here was a winning team—the mind of Hooke and the mechanical ability of Tompion. Hooke also invented the wheel-cutting engine, which enabled wheels to be made faster and more perfectly than by hand-filing methods.

It is quite possible that these men made the first grandfather clock, although this is hard to prove. At any rate, the long pendulums were used during this time and needed a long case to cover the unsightly parts and keep out the dust. They simply stood on the floor, and, since candles were placed high to be out of reach of small children, the dial could easily be seen by candlelight.

The very early cases were made of oak, very plain, but this soon changed to take on the style of the period, with inlays of ebony and olive wood. Clockmaking flourished in this period, patronized by the nobility and others of means and wealth, although out of reach of the average man's purse.

Thomas Tompion's clocks were sold on the continent as well as in England, and his fame spread rapidly. He soon became a much copied craftsman, and the watch and clock business became a rapidly growing business in many countries.

America was expanding, and there were a few clockmakers here who made grandfather clocks. Then came the Revolutionary War, and some British clockmakers came here to fight and stayed on after the War. They plied their trade and also taught the Americans how to make clocks. This happened along the eastern seaboard, mostly in Connecticut and Massachusetts.

Our own state of Pennsylvania was also known as a great clock state, as we had many people of German origin who were experts. These were fine makers, and many of their clocks are still to be seen, keeping time in private homes and elsewhere. Among the

greatest of these was David Rittenhouse, who made the most complicated clocks, of great beauty and workmanship.

Later many factories sprang up for the exclusive purpose of clockmaking, and America is known today for her fine machines with the interchangeable parts—the result of long thought and toil on the part of American clockmakers who, as time passed, saw the need of an assembly-line system of manufacturing.

Recently a handsome grandfather clock has been installed in the President's office at Carnegie Institute, the gift of Lawrence C. Woods, Jr., a member of the board of trustees. It formerly stood in his family home in Sewickley. The movement is Waltham, dating around 1903, and its mahogany case stands eight feet tall. The face of the clock is silver-plated brass, the hands are of tooled steel, the pendulum is shining brass, tubes are nickel steel, and the weights are brass casings filled with lead. It has both Wittington and Westminster chimes. The clock shows phases of the moon, as well as time of day.

It may be of interest to note that Westminster chimes, which play the familiar tune from many a cherished family clock, were first used on Big Ben in the tower of the House of Parliament in London, installed around 1856.

This brief sketch of clock history may show how much we owe to the great clockmakers of the past, who thought and worked to perfect clock mechanisms and thus paved the way for industrial progress.

Many men of inventive genius in our country, such as Eli Whitney, Robert Fulton, Henry Ford, and George Westinghouse, are known to have taken an interest in watchmaking early in their careers.

All this I think about when I see a beautiful grandfather clock.

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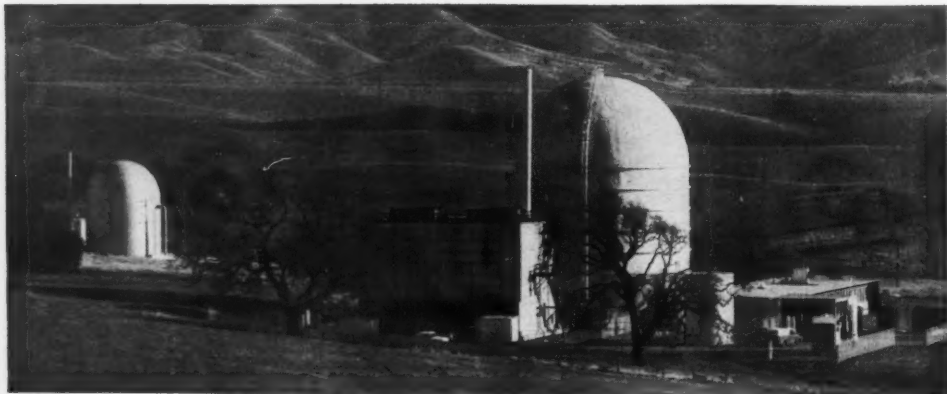
BEFORE ATOMIC POWER can light our cities or run our industries efficiently, the cost of building and operating commercial atomic reactors must be reduced. The two big problems: high cost of nuclear fuel, and the need for better and less costly materials of construction.

Firsthand information on the effects of radiation on steel has not been easy to come by. The start-up of the General Electric Test Reactor, near Pleasanton, California, and the Westinghouse Testing Reactor near Pittsburgh has enabled U.S. Steel to launch the first large-scale private investigation of irradiated steels. These explorations will be carried out in private test reactors, wholly financed with private capital.

Today, U.S. Steel has scientists working full-time at Westinghouse and General Electric Atomic Laboratories; extensive applied research in nuclear steels is also being carried on at U.S. Steel's Monroeville Research Center.

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USS United States Steel

DARWIN AND HIS THEORY

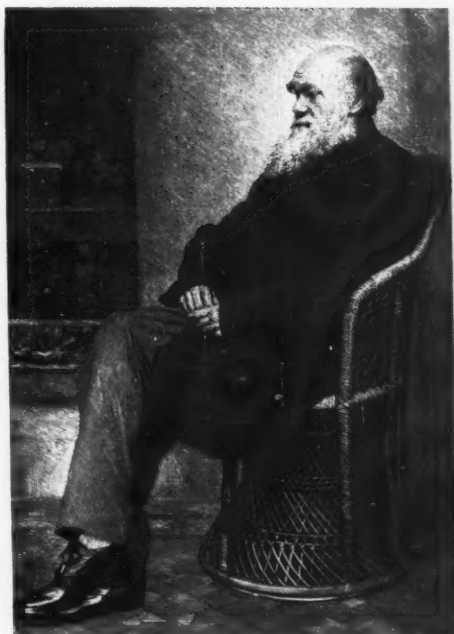
O. E. JENNINGS

THE year 1959 has been notable not only for Pittsburgh's Bicentennial celebration but also as the centennial of publication of Darwin's *Origin of Species*, written in his fiftieth year. It is also the sesquicentennial of publication of Lamarck's famous but generally discredited theory of the inheritance of acquired characters.

Charles Robert Darwin was the fifth in a family of six children, the younger of two sons. His father was a successful, well-to-do physician in Shrewsbury on the Severn River, northwest of London. His mother, Susannah, was the daughter of Josiah Wedgwood, famous potter.

Charles's mother died when he was eight years old, and after a year in the local day school he was sent to a nearby boarding school. The boy retained his home ties, however, by running home frequently during his free hours. The school was strictly classical except for a little geography and ancient history. In Darwin's *Autobiography* he says: "The school as a means of education to me was simply a blank." However, he enjoyed Euclidean geometry under a private tutor, and was deeply interested when his uncle explained to him the principle of a barometer's vernier. This uncle was father of Francis Galton, later to become known as founder of the science of eugenics.

During these school days Charles made collections of various objects, such as shells, coins, and minerals, and he also became very fond of partridge-shooting. His brother often let Charles work with him on chemical experiments in their garden tool house, particularly on gases. His schoolmates soon dubbed him "Gas," and the headmaster publicly rebuked him for spending time "on such



CHARLES DARWIN

Wood engraving in *Century Magazine* (January, 1883)
From a photograph by Captain L. Darwin (1874?)

useless subjects." Darwin said later: "This was the better part of my education at school, for it showed me practically the meaning of experimental science."

Since he was doing rather poorly with his school work, his father sent him at the age of sixteen to Edinburgh University, where his brother was about to complete his studies, to begin the study of medicine. Somehow, however, Charles found out that he would in time inherit enough to live comfortably, and lost his interest in medicine.

His brother, having completed his studies at the end of the year, left Charles to his

own resources at the University. He soon associated himself with a group of young men who, like himself, were interested in natural science, and attended meetings of the Plinian Society, the Royal Medical Society, and the Royal Society of Edinburgh. In the meantime, his father, having learned that he was not much interested in medicine, proposed that he study for the ministry. After due consideration, Charles agreed to this and made preparations to enter Cambridge University.

Again, academically his three years at Cambridge were wasted. His passion for partridge-shooting and riding got him into a sporting set. However, he also developed a taste for fine pictures and music and an intense interest in beetle-collecting. He relates that on one occasion he tore off a piece of old bark from a tree trunk and, seeing two rare beetles, caught one in each hand. Then, seeing a third, even more interesting, he popped the one in his right hand into his mouth.

"Alas! It ejected some intensely acrid fluid which burnt my tongue so I was forced to spit the beetle out, which was lost, as was the third one."

He attended some of Professor John Stevens Henslow's lectures on botany, and became so intimate with him that they took long walks together on most days, and he became known among the dons as "the man who walks with Henslow."

Through Professor Henslow he met a group of older men of high intellectual standing, who often invited him to go with them on long walks in the country. On one occasion he read to them abstracts from Friedrich Heinrich Alexander von Humboldt's *Personal Narrative* extolling the natural wonders of Teneriffe, the largest of the Canary Islands, and Charles announced his intention of going there. In fact, he even

made inquiries about ships, but pursued the matter no further because of subsequent events.

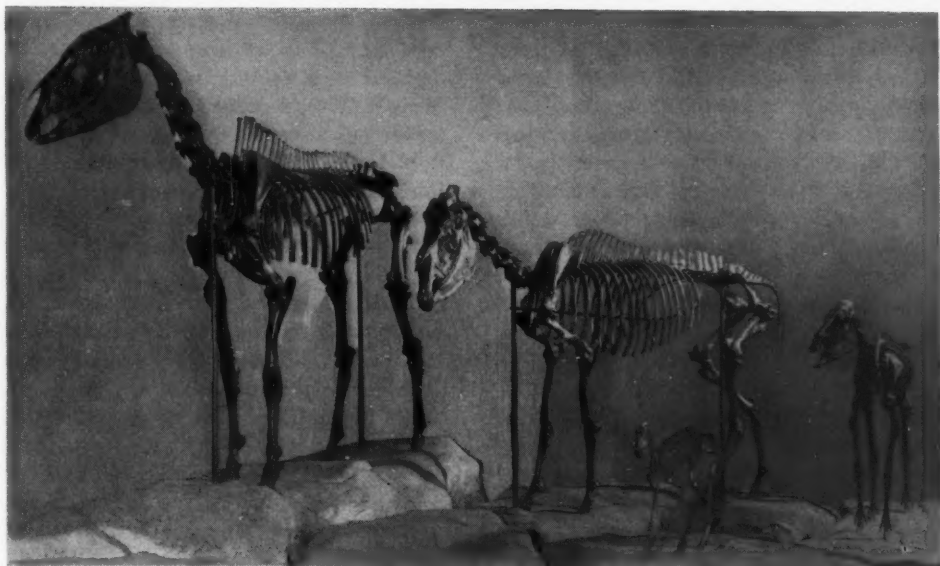
On his return from a trip into Wales with Professor Adam Sedgwick, he found a letter from Henslow informing him that Captain Robert Fitz-Roy would share his cabin with a suitable young man who would go without pay as naturalist on H.M.S. *Beagle*. This 240-ton brig of the British Navy had been commissioned to make a maritime survey of the coast of South America, particularly Chile and Patagonia, and also a general oceanographic survey. Through the intervention of his uncle, Charles's father finally consented to let him go.

During the voyage of almost five years not only were the coasts of South America surveyed, but stops were made at the Galápagos Islands, Tahiti, Australia, Tasmania, New Zealand, Keeling Island, the Maldives, Mauritius, St. Helena, Ascension, and the Azores, completing the circumnavigation of the globe.

Darwin suffered grievously from seasickness, which probably had something to do with his poor health in later years. However, he was busily engaged during the voyage in taking care of his collections and writing in his journal. He had taken with him on the voyage a copy of Sir Charles Lyell's *Principles of Geology*, in which, for the first time, geology was treated from an evolutionary standpoint. This largely influenced his thinking about the geology and biology of the places visited.

Upon his return to England he spent six busy years working with his collections and records, writing, getting married, and going

Dr. Jennings is director emeritus of Carnegie Museum and professor emeritus in biology at the University of Pittsburgh. He is an honorary member of the Western Pennsylvania Conservancy.



FOUR FOSSIL ANCESTORS OF THE HORSE IN AN EXHIBIT AT CARNEGIE MUSEUM
From left: *Equus caballus*, *Plesippus*, *Merychippus*, and *Meshippus*, the smallest and earliest, in right foreground

some into society where he met leading scientific and other prominent people. However, in 1842, because of poor health, he moved to Down, a few miles southeast of London, to spend the rest of his life in semi-seclusion, occupied in writing as much as poor health and more serious illnesses would permit. For his work he accumulated an extraordinarily large reference collection of notes and abstracts on evolution, based on his own travels, observations, and experiments, and supplemented from his extensive reading and correspondence.

This culminated in his beginning, in July, 1837, a notebook on the subject of evolution. In October, 1838, he happened to read the *Essay on Population* by Thomas Robert Malthus, the political economist, who pointed out that in nature the populations of animals and plants both tend to increase faster than the food for subsistence. Darwin, being well

aware of the fact that individuals, even of the same species, tend to differ from one another, and that they compete or struggle with one another for food and other conditions favorable for their existence, says: "It at once struck me that under these circumstances favourable variations would be preserved and unfavourable ones be destroyed. The result of this would be the formation of new species."

He wrote out a brief statement of this theory in pencil in June, 1842, and two years later enlarged it to 240 pages.

In 1856, at Lyell's request, he was writing it out much more fully when he received from his friend and fellow naturalist-explorer, Alfred Russel Wallace, a brief essay *On the tendency of Varieties to depart indefinitely from the Original Type*. Wallace, like Darwin, upon reading Malthus' *Essay on Population*, had had exactly the same sud-

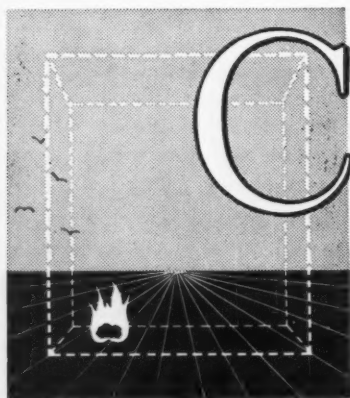
den inspiration! Between fits of intermittent fever at Ternate, in the East Indies, he wrote his brief essay and sent it to Darwin within three days, asking him to submit it to Lyell.

In deference to his friend, Darwin decided to lay aside his own work of so many years and let Wallace have the credit for announcing the theory. However, Lyell, the geologist, and Sir William Jackson Hooker, the botanist, finally persuaded him to submit to the Linnean Society of London a brief abstract of his own unpublished work together with a letter he had written on September 5, 1847 to Asa Gray, the American botanist, explaining it, along with Wallace's essay. This was done, and they were published together by the Linnean Society late in 1858.

Soon thereafter Darwin hurriedly prepared a revision of his earlier work, and it

was published November 24, 1859. The first edition of 1,250 copies was sold out the first day. A second edition was soon exhausted. In 1876 Darwin noted that some 16,000 copies had been sold in England alone, and it had been translated into almost every European language. The full title of the book is: *On the Origin of Species by Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. In our present state of knowledge, the excitement and bitter controversies aroused by this book and by Darwin's later *Descent of Man* (1871) seem now almost incredible.

The general idea that the earth and its plants and animals have undergone a more or less gradual change or evolution has been entertained by philosophers at least as far back as Aristotle, two thousand years ago,



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but more concrete ideas awaited progress in the natural sciences. Around the 1790's, in prose and poetry, Erasmus Darwin presented essentially the substance of the theory published by his famous grandson, Charles Darwin, sixty years later.

Of the various theories advanced during the 1800's, that of Jean Baptiste Pierre Antoine de Monet de Lamarck, the French zoologist, was outstanding. In his *Philosophie Zoologique* published in 1809 (the year of Darwin's birth), he contended that characters acquired by the parents could be transmitted to their offspring. Giraffes, he stated, for example, make their necks longer by stretching up into the trees to browse, and so their offspring will be born with longer necks.

As reported recently by C. D. Darlington in *Scientific American*, Lamarck's theory was repudiated in 1813 by three physicians working independently, W. C. Wells, J. C. Prichard, and William Lawrence, all Fellows of the Royal Society. These men, like Erasmus Darwin, proposed a natural-selection theory essentially the same as that of Darwin and Wallace.

Others also advanced similar opinions, so that the time was ripe for the publication of Darwin's *Origin of Species* in 1859. His work, however, contained and was backed up by an extraordinary array of facts and observations such as no other man could muster. Thus it was quite natural and fitting that the theory should be associated with the name of Charles Darwin.

For the theory of natural selection to hold, it is necessary that the individuals which struggle for existence and survival be different from the others. But why they differ was a puzzle to Darwin. Had his *Origin of Species* been published later, it might have been better, for he would have had Mendel's research to draw upon. An Augustinian

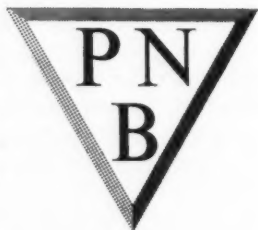
monk, Gregor Mendel, in 1866 published in an obscure periodical the results of his experiments with garden peas. From his work he had found that certain hereditary traits may be segregated or combined with resulting differences in the progeny. This was the basis for the science of genetics. As a result, in more recent times the chromosomes and genes, the bearers of heredity, can be manipulated and are to the geneticists what nuclei and electrons are to the nuclear physicists. Darwin's puzzle about individual differences would have been further solved had he known of *The Mutation Theory* written by the Dutch botanist, Hugo De Vries, about the sudden appearance of sports (mutants) more or less different from other progeny.

With the progress of scientific research and discovery, the Darwin-Wallace theory of the origin of permanent species by natural selection is more and more justified. We can imagine the interest with which Darwin would have studied such modern museum exhibits as those in Carnegie Museum illustrating the evolution of the horse and of the camel and their increasing fitness to the environment in which they evolved.

A most interesting proof of the correctness of the Darwin-Wallace theory has appeared recently in an article by H. B. D. Kettlewell, published in *Scientific American*. In the heavily industrialized parts of England, some seventy of the light-colored or light-patterned species of moths that habitually rest during daytime on the bark of trees, now soot-begrimed, have evolved dark-colored or even black forms. These have better escaped notice by the moth-eating birds, and have thus survived. In reporting on the results of his extensive research, Dr. Kettlewell writes: "Before Darwin died in 1882, the most striking evolutionary change ever before witnessed by man was taking place around him in his own country."

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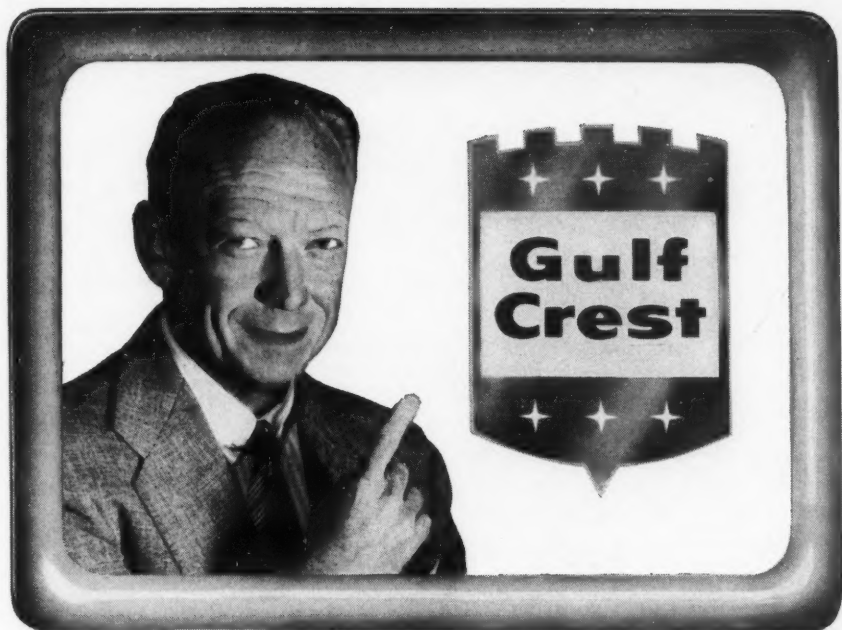
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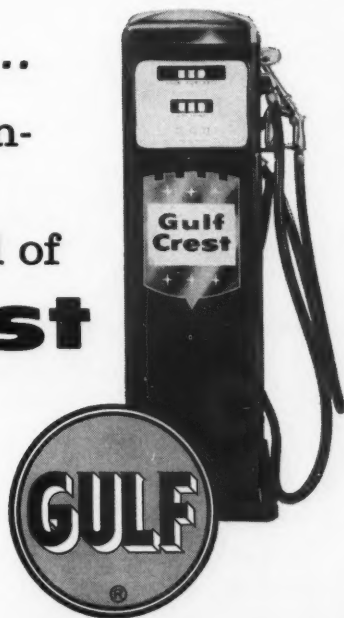
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